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Issued April 29, 1907.

United States Department of Agriculture,

FOREST SERVICE—CIRCULAR 93.

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FOREST PLANTING LEAFLET.

YELLOW POPLAR (*Liriodendron tulipifera*).

FORM AND SIZE.

The mature, forest-grown yellow poplar, or tuliptree, has a long, straight, cylindrical bole, clear of branches for at least two-thirds of its length, surmounted by a short, open, irregular crown. When growing in the open the tree maintains a straight stem, but the crown extends almost to the ground and is of conical shape.

Yellow poplar ordinarily grows to a height of from 100 to 125 feet, with a diameter of from 3 to 6 feet and a clear length of about 70 feet. Trees have been found 190 feet tall and 10 feet in diameter.

RANGE.

Yellow poplar is distributed sparingly through southern New England and New York; it is more plentiful on the southern shore of Lake Erie and westward through northern Indiana and Illinois. It extends southward into Alabama and the other Gulf States as far as northern Florida. West of the Mississippi it is rare, except in northeastern Arkansas and southeastern Missouri. It is most abundant and of largest size in the south central part of its range, especially in Tennessee, Kentucky, and the western Carolinas, and in the basin of the Ohio River and its tributaries. It is characteristic of the distribution of yellow poplar that it is scattered by single trees or in groups throughout the forest, and is rarely the predominant tree except in the South, under especially favorable conditions. It is commonly associated with chestnut, the oaks, walnuts, hickories, maples, black cherry, locust, and beech; and is occasionally found with hemlock and white pine.

The tree is hardy east of the Mississippi, except in the colder portions of the Northern States; and, on suitable soils, may be planted throughout its range.

HABITS AND GROWTH.

Yellow poplar is very exacting in soil and moisture requirements. It demands deep, fertile, well-drained soil and a constant and even supply of soil moisture. The tree grows best on moist loam or rich sandy soil in which is mixed a considerable quantity of humus. It does not thrive on heavy clay or dry ridge soils, and can not grow in standing water. In its early life it requires a fresh, porous, upper soil. The largest specimens are found in protected coves along water courses and on the northern and eastern slopes of ravines and valleys.

The tree is very intolerant and prunes itself well with even moderate side shade. While the seedlings can endure considerable shade, the trees demands more light as they grow older, and at maturity are nearly always taller than their associates, with their crowns fully exposed.

In early life the growth is principally in height, and the development of one continuous main stem is characteristic throughout. The growth is rapid and the tree often lives more than three hundred years; during the first forty or fifty years the height growth is from 1 to 2 feet annually, and the average diameter growth from one-tenth to one-fourth inch. After fifty years the rate of growth gradually decreases.

Yellow poplar is very susceptible to injury by fire. Old trees are often hollow-butted as the result of repeated burning about the base. Near the western limits of its range the tree is sometimes injured by sun scald.

Injuries by insects should be reported to the Bureau of Entomology, United States Department of Agriculture.

ECONOMIC USES.

The wood is usually light, but varies in weight; it is soft, tough, but not strong, and of fine texture. It is fairly durable when exposed to the weather or in contact with the ground. It shrinks slightly and seasons without injury, and works and stands exceedingly well. The sapwood is thin, light in color, and decays rapidly. The wood is used for siding, paneling, and interior finishing, and in the manufacture of toys, boxes, culinary woodenware, wagon boxes, carriage bodies, slack staves and heading, and backing for veneer. It is in great demand throughout the vehicle and implement trade, and also makes a fair grade of wood pulp.

With the diminution of the white-pine supply yellow poplar is much used in its place. The lumbermen recognize two kinds of poplar timber, white and yellow. The difference in color is caused mainly by the difference in site conditions, since trees grown on dry, gravelly soil produce a wood that is lighter in color and harder to work, and is called "white poplar" or "hickory poplar." The "yellow poplar" is grown on rich alluvial or limestone soil, and has a rich yellow heartwood which is highly prized because of its fine grain and easy working qualities.

Yellow poplar is an excellent tree for shade and ornament, and is especially suited to these purposes in cities where bituminous coal is burned. Forest planting of this species for economic purposes has never been attempted, but it should prove profitable wherever natural conditions are favorable, because of the rapid growth of the tree, its large size and splended form at maturity, and the value of the wood.

PROPAGATION.

Yellow poplar reproduces itself almost entirely by seed. Its ability to sprout from the stump is very limited, and can not be depended upon.

Seeds are produced abundantly nearly every year, though only from 5 to 10 per cent are fertile. They are borne in a cone-like fruit 1 to 2 inches long. Young trees are likely to produce seed which is absolutely worthless, and on older trees good seed is found only in the centers of the cones on the highest limbs. Seed should be collected in the fall when mature, and may be sown at once or stratified in sand for spring planting. It is advisable to plant in the fall; germination will then take place the following spring. If sown in the spring the seeds have a tendency to lie in the ground a year before germinating.

The use of nursery-grown seedlings or transplants is recommended for establishing plantations of yellow poplar. Sowing in the permanent site, however, is occasionally successful.

To grow nursery stock the seed should be sown thickly in drills, in light, rich, sandy soil and covered to a depth of one-half inch. It is especially important that the soil be kept evenly moist. More water should be supplied during the germinating period than later. It may be found necessary to provide partial protection on hot, sunny days during the first season, especially in the South. Seedlings may grow in the nursery for one or two years, but should not remain longer, because of the strongly developed taproot and few lateral roots, which make transplanting difficult. Transplanting 1-year-old seedlings into nursery rows will stimulate the development of fibrous roots and insure vigorous plants, but this operation is not generally

advisable, because of the added expense. If seedlings are left for more than one year in the seedbed they should be cut back to the ground before being moved. Vigorous sprouts will then replace the stems.

PLANTING.

Seedlings reach suitable planting size in one year, and should be transferred to the field very early in the spring, before the buds start. They should be spaced 6 feet apart each way. No preparation of the whole site prior to planting is needed, except where there is a tough sod. In this case the ground must be broken and the grass turned under if possible; otherwise the sod should be removed from a small area where a tree is to be placed.

Yellow poplar is not well adapted for planting in pure stands, but should be mixed with other deciduous species. Unless the other trees in the mixture are slow-growing it must be given a start, so that it will not be overtopped. If the plantation is in a sheltered valley or rich bottomland, yellow poplar may be planted as the predominant tree of the mixture. In more exposed situations the species with which it is planted should be in excess, to provide protection from high winds and frost.

Any moderately shade-enduring hardwood may be planted with yellow poplar, or mixture with white pine and Norway spruce should also prove suitable.

CULTIVATION AND CARE.

Yellow poplar will rarely be planted on tillable land, so that cultivation in most cases will be impossible. Ordinarily young trees will not be choked out by grass or weeds because of their rapid growth. When field sowing of the seed is practiced, however, it may be necessary to check the weeds for the first two or three years.

No grazing should be allowed in the plantation and fires should be absolutely kept out, since the yellow poplar, even when mature, is very easily injured by fire.

[Cir. 93]



